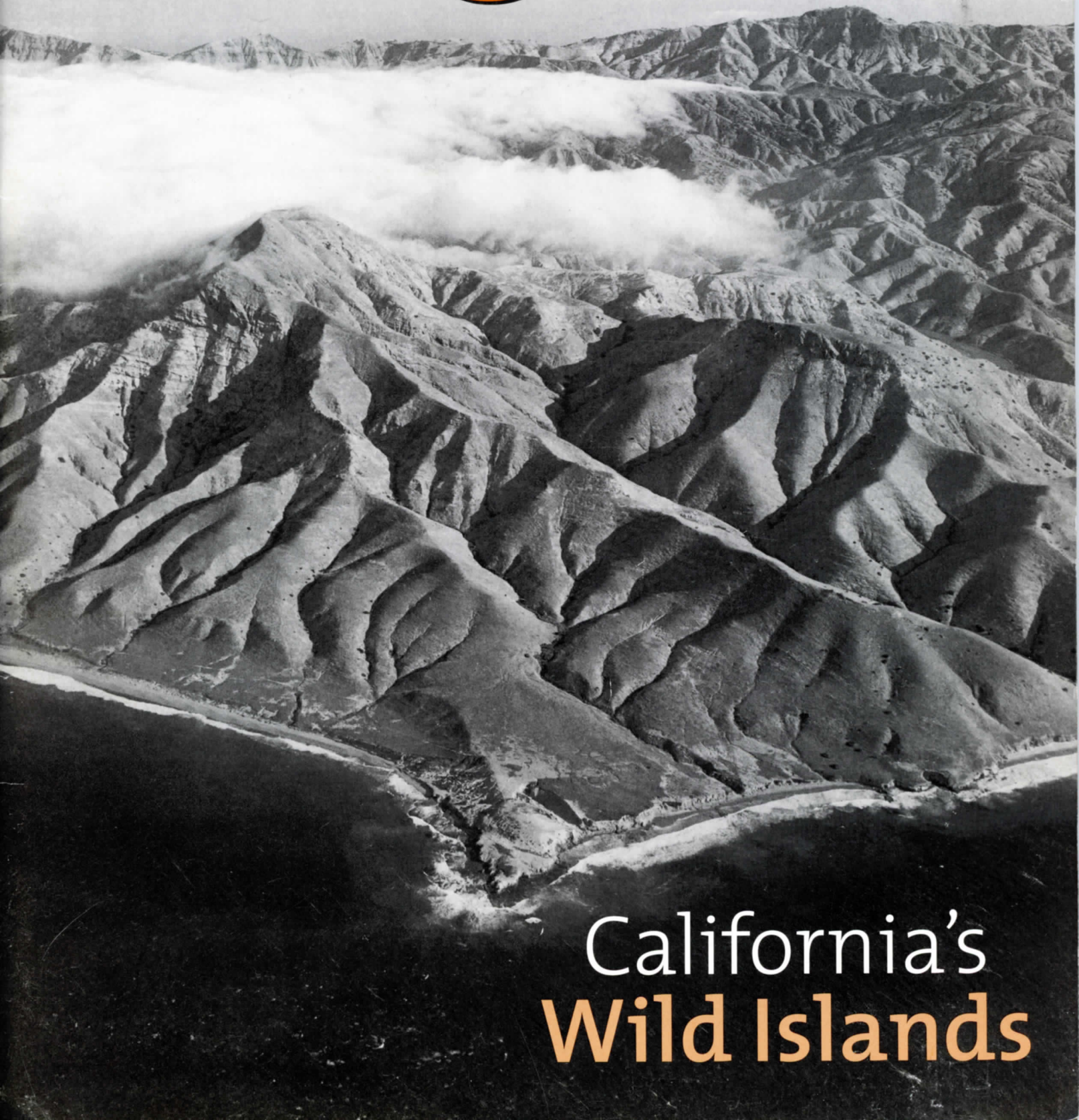


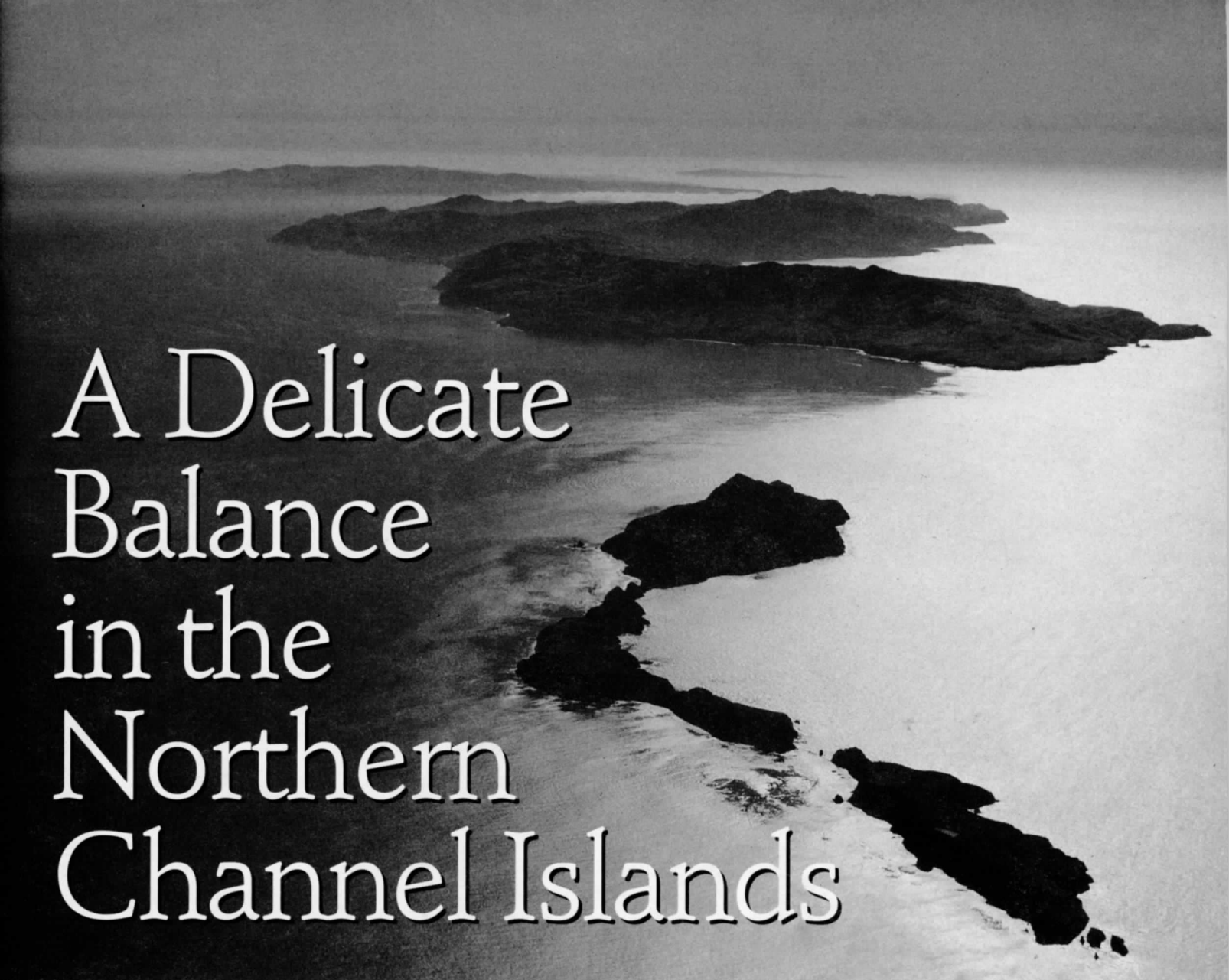
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California's
Wild Islands



A Delicate Balance in the Northern Channel Islands

WM. B. DEWEY

ANNE CANRIGHT

I have never been fond of scrub jays. They're not especially pretty to look at, and only another jay could love their raspy screech.

One day this past July, though, I developed a new respect for this bold bird. Into the bargain, I gained a greater understanding of the delicate ecological balance of islands and of the pivotal role humans can play in maintaining—or upsetting—that balance.

I was sitting, binoculars at the ready, in a rocky, oak-studded canyon on Santa Cruz Island, one of the four northern Channel Islands off the coast

of Santa Barbara County. (The other three are San Miguel, Santa Rosa, and Anacapa.) I had just

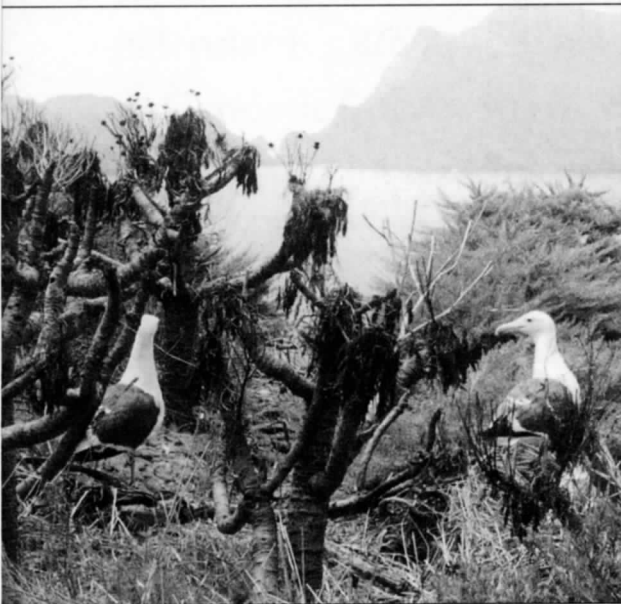
seen a blue shape float over the golden grass and into an evergreen shrub and was scanning the vicinity for another sign of life. Suddenly, in a toyon very close by, a bird landed, then

inched along a branch, peering this way and that in search of prey. It looked like a more self-confident version of a mainland jay: bigger, prouder, and considerably bluer. It pounced and pincered a good-sized insect in its beak. More head-





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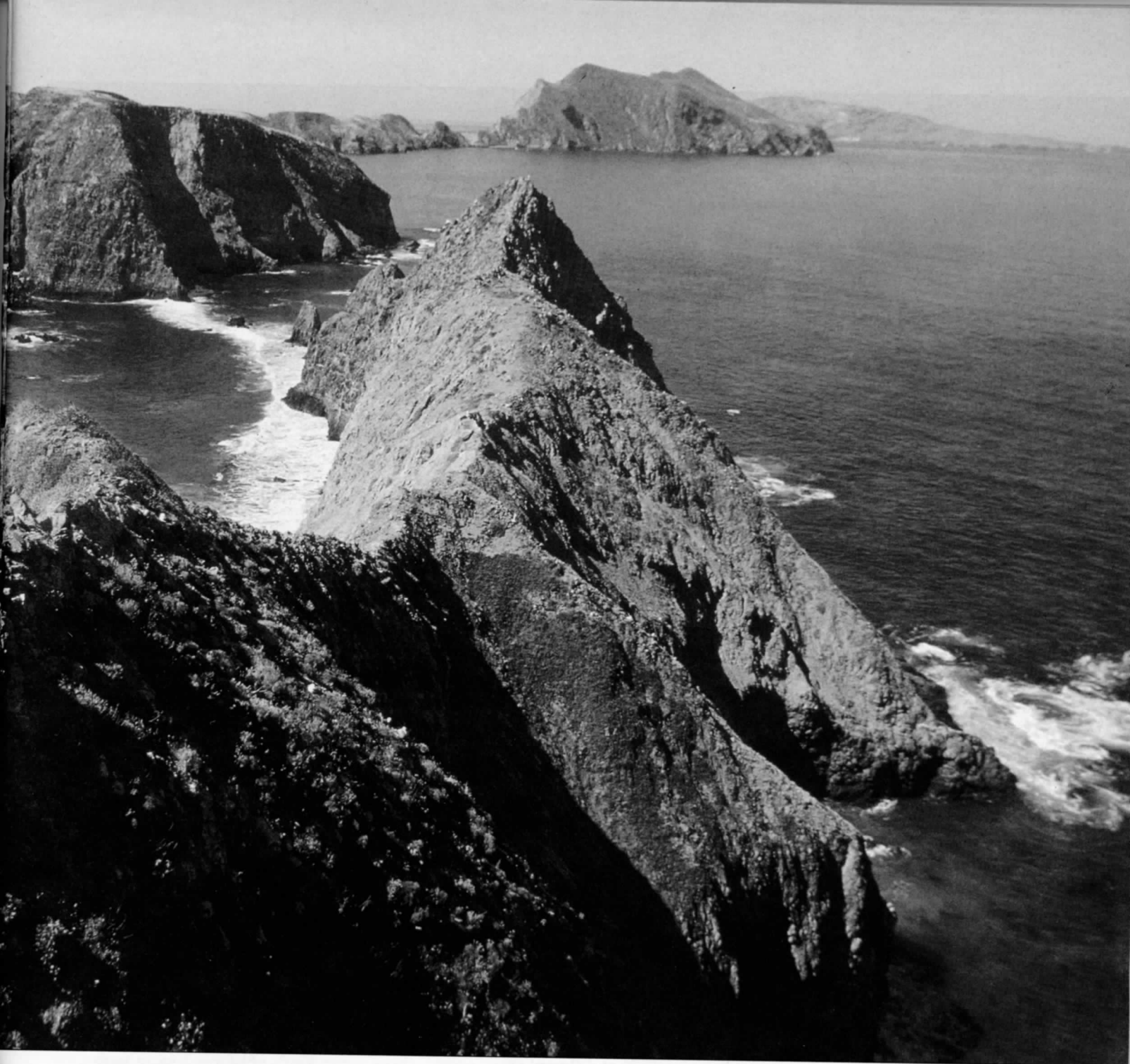
STEPHEN R. GLIEMMAN



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Top: Island scrub jay habitat in Upper Scorpion Canyon on Santa Cruz Island
Center left: Gulls among giant coreopsis on East Anacapa Island with Middle and West Anacapa in the background
Center right: This island spider spins an interesting web pattern.
Bottom: Island fox
Right: Middle and West Anacapa Islands



WM. B. DEWEY

cocking, and another pounce, its eyes sparkling brightly. It couldn't have cared less that I was sitting not ten feet away.

The island scrub jay, *Aphelocoma insularis*, is a very special bird, and I felt privileged to watch it hunt from such close quarters. It is the only endemic species of bird on the California islands, found on Santa Cruz Island and nowhere else. A few other birds on the Channel Islands have evolved into one or more endemic races, or subspecies—among them the California quail, Allen's hummingbird, horned lark, and Bewick's wren—but *A. insularis* is the only one that is

considered a fully separate species.

At first glance you might think you've spotted a western scrub jay, *A. coerulescens*. On closer inspection, though, you'll mark the differences: the insular species is a third again larger than its mainland cousin, its beak is heavier, and it is a brighter blue. Its call has been described as sounding like a western jay with laryngitis (my bird was hunting quietly, so I cannot attest to this, alas), and its repertoire includes vocalizations not found among its mainland cousins. Unlike the western scrub jay, the island jay can be found feeding on the



Above: Students of the University of California at Santa Cruz Natural History Field Quarter study native plants in a hillside meadow.

Right: Several of the oaks on the island are unique species or hybrids of mainland species that occur in forms not seen on the mainland. This oak is probably mostly *Quercus xmacdonaldii*, a hybrid of scrub oak and valley oak.

Far right: An example of hybridization from the island. The smaller red endemic island sticky monkey flower on the right (*Mimulus flemingii*) shows introgression with the mainland form of the monkey flower (*Mimulus longiflorus*) on the left.



PHOTOS THIS PAGE: STEPHEN R. GLIESSMAN

ground. The island jay also lives longer, and it has a somewhat different social organization than the mainland bird.

Why these differences? The answer lies in the nature of islands, which are separated from the mainland by a formidable barrier: water—sometimes a lot of it. That barrier is not impenetrable, of course, but it does deter crossing by wildlife. In addition, water gives islands very definite edges. On the mainland, a plant or animal can extend its range beyond its preferred habitat when pressed, but on an island there's no such out—short of swimming or floating or flying back to the continent. An island's size and its distance from the

mainland combine, then, to determine just how many kinds of plants and animals can live there in equilibrium. The more distant and hard to reach an island is, the smaller the number of species that can gain a foothold; the smaller the island, the fewer species it can support.

Once a plant or animal reaches an island, the particular habitats available, the absence of predators, the limited gene pool, and the lack of interaction with mainland species virtually ensure that changes will occur. Adaptations that are valuable for survival in a more competitive mainland environment may become less important; new adaptations develop that are geared to

the specific conditions at hand.

As I mentioned, the island scrub jay is considerably larger than its mainland cousins. In fact, island-bound birds—along with rodents and insects—tend toward this “gigantism” as a rule. (The South Pacific island of Saint Helena, to cite a particularly creepy example, has earwigs three inches long!) The opposite tendency, toward dwarfism, is noted in larger animals, such as deer and fox.

With few predators waiting to eat them and little competition for food, small animals can afford to be larger. Larger size allows more efficient fat and water storage, which in turn improves survival prospects through lean times; it allows larger babies; and it literally allows animals to throw their weight around better when competing with members of their own species. Gigantism is the evolutionary result.

Dwarfism, in contrast, seems to occur because of a limited food supply. Unlike rodents, which become automatically less prolific when crowded, larger mammals lack intrinsic population control. When food is scarce, therefore, the young may be malnourished and stunted. If smaller individuals, now adapted to a less abundant resource base, achieve better reproductive success than big ones, the stunting can, over many generations, be perpetuated in dwarfism. Compactness may also allow

greater agility, enabling animals to exploit hard-to-get-at resources. And the absence of predation may be a factor as well: there’s simply no need to be so big if there’s nobody to fight off.

One of the most spectacular examples of dwarfism on the Channel Islands is the pygmy mammoth. Back in the Pleistocene, when sea level was several hundred feet lower than it is today, the northern islands were all one big land mass (known today as Santarosae) separated from the mainland by only a few miles. Around 40,000 to 20,000 years ago, a small group of Columbian mammoths (*Mammuthus columbi*), standing some 14 feet at the shoulder, apparently made their way across the Santa Barbara Channel. How? Simple: they swam, sticking their trunks up out of the water—natural snorkels. They may have ventured across the water for various reasons: limited food supplies on the mainland due to famine or drought may have forced them to find another source of sustenance; or perhaps an onshore wind simply brought the delectable smell of edible greenery wafting past their noses and they decided to check things out. In any event, once they reached Santarosae, they were there for good. And then the “downsizing” began. Ultimately a new species, *M. exilis* (the “exiled mammoth”), developed—measuring a dainty five or six feet from heel to shoulder.

The imperial mammoth (*Mammuthus columbi*) stood 14 feet tall at the shoulder and ranged from central Canada to Mexico during the middle Pleistocene era. The American mastodon (*Mammut americanum*) stood 11 feet tall and lived in boggy areas of North America, especially around the Great Lakes. The Pygmy mammoth (*Mammuthus exilis*) stood 6.5 feet tall at the shoulder and was found on the three northernmost Channel Islands. Dr. Tom Rockwell, a geologist from San Diego State University, discovered the first virtually complete pygmy mammoth skeleton in 1994 in an elevated marine terrace on Santa Rosa Island.

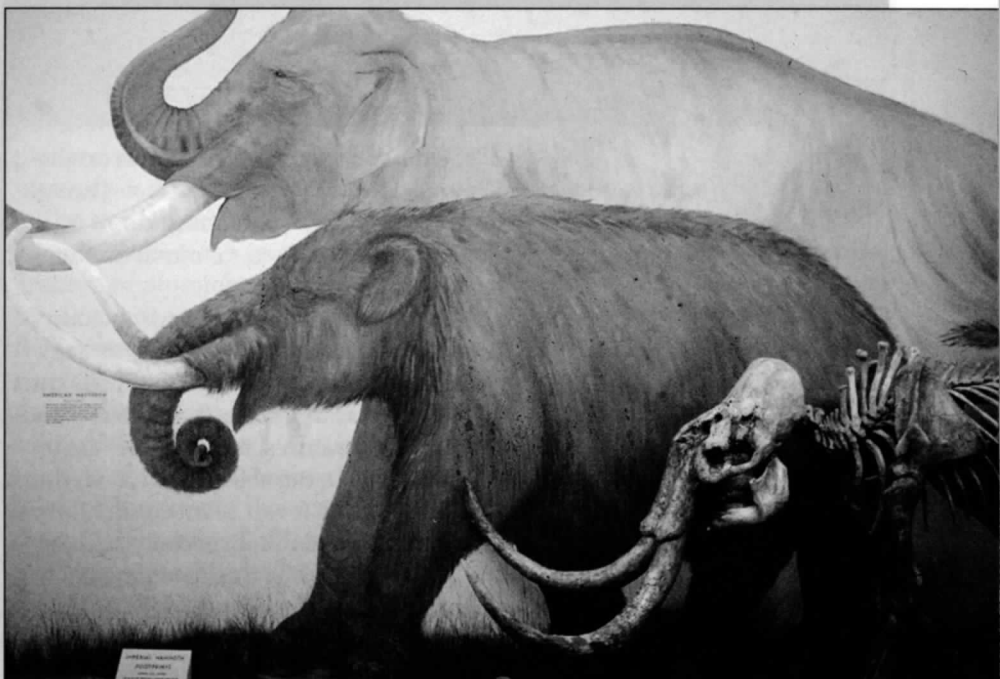


PHOTO COURTESY SANTA BARBARA MUSEUM OF NATURAL HISTORY



In 1993, a bone fragment from the skeleton of a woman found at this 1960 excavation in Arlington Canyon on Santa Rosa Island, previously thought to be 11,600 years old, was redated using advanced techniques of bone chemistry analysis and radiocarbon dating. It turns out she is an astounding 13,000 years old—one of the oldest known humans in western North America, and the oldest in California. She may well have witnessed the pygmy mammoths lumbering about their business.

eral buckwheats also grow considerably larger than their mainland relatives.

THE ISOLATION AND LIMITED SIZE of islands allow species to evolve into unique forms. They also dramatically increase the chances of extinction. On islands throughout the world, scores of species have been lost—far more than on continents. The Mascarene Islands in the west Indian Ocean, for instance, have lost at least fourteen bird species (among them the dodo) within the past 300 years—as many as the combined losses on the mainlands of Asia, Africa, and North America over the same period of time. Hawaii has lost more bird species than have been lost from all the continents on Earth. And the list goes on.

The reasons for this vulnerability are many and complex. Right up there among the culprits, though, are human activities: hunting and collecting, habitat disturbance, habitat destruction, and introduction of alien species, all of which have affected the natural history of the Channel Islands. Hunting, for example, may well have led to the extinction of the exiled mammoth and a flightless goose known today only from the fossil record, and it certainly contributed to the bald eagle's extirpation from the islands.

Over the past century, however, the main processes upsetting the balance of life on the Channel Islands are habitat disturbance and destruction. Grazing, plowing, farming, and military maneuvers including bombing have combined to set into motion a cascade of effects that threaten the survival of many unique island species.

The first human inhabitants were of course Native Americans, who may have reached the Channel Islands some 13,000 years ago (some scientists place their arrival as early as 40,000 years ago) and certainly had permanent settlements on all of the larger islands by 5000 B.C. They affect-

The other dwarf species of note on the Channel Islands is the island fox. Though only about the size of a house cat, it is the largest native land mammal on the islands.

"Giant" species on the islands include lizards and various rodents, such as the deer mouse and spotted skunk. Plants can also evolve to large sizes, thanks to relatively mild temperatures, moisture available from marine air, the absence of native grazing animals, and fewer plant competitors than on the mainland. Especially striking is the giant coreopsis, a thick-stemmed, woody plant that can grow to six feet in height. Found on all the islands, it blooms in late winter and early spring in an explosion of bright yellow daisylike flowers. Sev-

PHOTO COURTESY SANTA BARBARA MUSEUM OF NATURAL HISTORY



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ed island vegetation through food-gathering activities, including setting fires and introducing desirable edibles, and they may well have cut down trees or shrubs for shelter, for fuel, or to make baskets. The bulk of their diet, however, came from the sea—a vast and relatively limitless resource, given their small numbers (an estimated 3,000 at the time of first European contact).

Although European explorers made brief visits to the islands in 1542 (Cabrillo) and 1601 (Vizcaíno), it wasn't until 1769, with the arrival in Alta California of the Franciscans and, shortly thereafter, Russian, English, and American fur traders, that the ecological balance on the islands tilted. And when it did, it tilted dramatically. During the next 50-odd years, the Native American populations on the islands were decimated by European diseases, introduced, it is thought, largely by otter hunters, who at the same time brought about the local elimination of the sea otter, northern fur seal, and northern elephant seal. In 1812 a tremendous earthquake, with an epicenter near Santa Cruz Island, apparently convinced the remaining islanders to accompany the mission fathers back to the mainland. By the 1820s all the native inhabitants had been removed from the Channel Islands—the sole exception being a woman who lived alone on San Nicolas Island for

18 years and whose remarkable story was immortalized in Scott O'Dell's book *Island of the Blue Dolphins*.

During this same period, goats, pigs, and sheep were introduced to most of the islands. These animals soon reverted to a wild (feral) state; reproducing rapidly, they probably extirpated many plant species, and they certainly altered almost all native plant communities.

The first European settlers moved to the islands in the 1830s to farm and to raise sheep and cattle. Each island had a slightly different history from this point on, but plants and animals totally alien to the insular ecosystem were introduced to all.

The two largest northern Channel Islands, Santa Cruz and Santa Rosa, were granted to prominent local families by the Mexican government in the mid-1800s, and they remained in private hands until quite recently. The Santa Cruz Island ranch produced sheep, cattle, honey, olives, and some of the finest early California wines (until Prohibition). The ranch on Santa Rosa became one of the major wool producers of southern California. Anacapa, San Miguel, and Santa Barbara Islands were also heavily grazed or cultivated. The Coast Guard established a presence on Anacapa and San Miguel Islands early in this century, and during World War II the



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Top: Cowboys drove cattle from Lobo Canyon to the main ranch at Becher's Bay on Santa Rosa Island, 1994.

Above: This island endemic succulent (*Dudleya greenii*) occurs on Santa Cruz, Santa Rosa, and San Miguel Islands, but not on the mainland.



STEPHEN R. GLIESSMAN

A student from the University of California at Santa Cruz holds fennel, an invasive alien plant, which she has uprooted to help natives recover.

islands played an important role in southern California's coastal defenses. Between 1948 and 1970 the U.S. Navy used San Miguel as a bombing range, though in 1963 the Navy and the Department of the Interior signed an agreement to jointly protect "the natural values and historic and scientific objects" on that island.

Federal efforts to preserve these unique islands began in 1938, when President Franklin D. Roosevelt proclaimed Santa Barbara and Anacapa Islands as Channel Islands National Monument. Supervised visitation to San Miguel Island has been allowed since 1976. Two years later a conservation partnership between the Nature Conservancy (TNC) and the private Santa Cruz Island Company provided for continued protection, research, and educational

use of most of that island. Finally in 1980, Congress designated the four northern islands, Santa Barbara Island, and the waters for one nautical mile around each as the nation's 40th national park, and later that year Channel Islands National Marine Sanctuary was established, extending protection to six miles out from the islands' shores.

Although Santa Rosa and Santa Cruz Islands were included in the national park in 1980, they remained in private hands for a number of years thereafter, and agreements still exist with the former owners allowing continued use. On Santa Rosa, for example, the Vail and Vickers Company ran a cattle stocking operation until 1998, and continues to sponsor elk and deer hunting under a lease that expires in 2011. The Nature Conservancy still owns 90 percent of Santa Cruz Island; the other 10 percent came under National Park Service ownership and management only in February 1997—completing public acquisition of the five islands included in the park. (The western nine-tenths of Santa Cruz Island is specifically exempt from purchase by the federal government and will remain in the hands of TNC.)

WHEN YOU LAND ON Santa Cruz Island, you can't help but notice the grass, which was California golden when I was there. Most of that grass is not native to the island, but was introduced, perhaps arriving as seeds on livestock and clothes and in supplies brought from the mainland. An annual, it thrives in disturbed areas created by cultivation, construction, and ranching activities. It is also opportunistic and easily outcompetes native perennial bunchgrasses.

Just behind the old Scorpion ranch house I saw a small group of sheep in a pen—the last remnants of a 30,000-strong feral population, scheduled to be deported from the island in an ongoing effort to restore native balance. Cattle also lived on the island until the mid-1980s. By trampling the roots of the native grasses and compacting the soil, these grazers encouraged the nonnative grasses, which rely for propagation not on roots but on seed dispersal.

Ironically, domestic livestock aren't all bad, at least where control of noxious weeds is concerned. When the Nature Conservancy eradicated sheep from its 90 percent of Santa Cruz Island in 1985, an outbreak of sweet fennel irrupted on the former grazing lands. Fennel is so invasive that today it covers some 10 percent of the island's surface. Moreover, it seems to be aided and abetted by another, even more aggressive exotic: feral pigs. By keeping the earth turned over, the pigs—natural rototillers—prevent native plants from becoming established, yet provide ideal conditions for invasive weeds like fennel, star thistle, and Mediterranean grasses. If balance is to be restored, both the fennel and the pigs will have to go. UC Santa Cruz environmental studies professor Stephen R. Gliessman is presently trying to determine how best to clear out the weedy invader and at the same time jump-start the recovery of native vegetation. As for the pigs, the task of hunting them down will be tricky, given their nocturnal habits and the rugged terrain on much of the island.

The other Channel Islands have similarly complex problems, but bit by bit solutions are being found. All of the islands, National Park Service biologist Tim Coonan says, are recovering from historic grazing, with native shrub communities beginning to beat out some of the annual alien grasses. San Miguel Island is a case in point, although there a separate chain of events is at work, endangering the future of the endemic San Miguel fox (see p. 12).

On tiny Santa Barbara Island, feral cats and rabbits, as well as grazing animals, have caused significant destruction to endemic species of plants and birds. The Santa Barbara song sparrow is now extinct, owing to cat predation coupled with a devastating fire in 1959. Yet there is good news too: after the last rabbits were removed in 1979, an endemic live-forever that was thought to be extinct made a recovery and now grows in a variety of habitats.

Anacapa Island's major success story lies in the recent reestablishment of seabird rookeries. In the 1960s and early 1970s the brown pelican population on West Anacapa suffered a colossal collapse owing to DDT contamination: in 1969, only 12 of 1,125 nests contained intact eggs, and no more than four chicks successfully fledged. DDT caused thinning of eggshells, and since pelicans actually stand on their eggs to keep them warm with their highly vascularized feet, the eggs were crushed. DDT was banned in 1972, and since 1980 up to 6,000 nests a year have been built on West Anacapa, making that island once again the largest pelican rookery in California. Other important rookeries on West and Middle Anacapa include Cassin's auklets and Xantus' murrelets. And East Anacapa is covered with western gulls—like the scrub jay, a bird I've never been especially fond of, though seeing the comical adolescents with their clown spots and hearing their plaintive peeps in concert with the raucous laughter of their elders did bring a smile to my face.

I WENT OUT TO THE ISLANDS to see what I could see. I, like millions of Californians and visitors to our coast, had driven past them many a time and wondered about them. As I rode the boat out to East Santa Cruz Island one foggy morning, and to East Anacapa the next foggy morning, I thought of the occasional views I've had from the mainland, of islands so crystal clear across the blue water that you feel you can reach out and run your finger along their ridgetops. I thought of their isolation, and of their bounded fragility. On a continent, plants and animals have opportunities that island species don't. On an island, however, life forms can evolve into something unique and special—a plus when circumstances are in balance, but easily thrown off kilter when the natural barriers of water and distance are breached. I saw evidence of the negative impact of

humankind in both places: the golden grasses of grazed hillsides on Santa Cruz, tangled clumps of ice plant on Anacapa. But I also got a sense of hope for the future, in the laughter of gulls and the flashing dance of dolphins, in the huddled defiance of the soon-to-be-banished sheep and the floating glide of pelicans. On Anacapa, the shriveled giant coreopsis plants will revive in the spring, and on clear, windswept days we'll be able to see the golden glow from shore and be thankful for the diversity of life struggling back into ascendancy in these island sanctuaries. ■

Anne Canright is a contributing editor to Coast & Ocean. She lives in Monterey County.

Giant coreopsis clings to the edge of a cliff.



STEPHEN R. GLIESSMAN